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Respectfully submitted [Page 1 of 2]

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Date 4/7/04
REGISTRATION NO. 32,132
(if appropriate)
Docket Number: 04004.012

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SANDING APPARATUS**TECHNICAL FIELD**

This invention relates to a sanding apparatus, and more particularly to an improved sanding apparatus usable for a wide variety of sanding and grinding applications.

BACKGROUND OF THE INVENTION

10 It is known in the art relating to sanders that conventional sanders have many shortcomings. First, it is known that when sanding or grinding a surface, especially when using a coarse and/or wide disc, that the sanding machine pulls away from the operator across the surface being sanded. Second, it is known that it is difficult to change a pad located underneath a sander because it is awkward to flip and stabilize the machine to access the pad. Further, it is known that when sanding a floor, sanders are not capable of sanding close to walls without causing damage to the walls. Usually a drum sander is used to sand a floor and it cannot be brought close to a wall during operation. This undesirably makes it necessary to use a separate tool to sand the edges of the floor.

SUMMARY OF THE INVENTION

The present invention provides a sanding apparatus that solves the aforementioned disadvantages of conventional sanders and that can be used to sand a variety of surfaces. The present sanding apparatus does not walk or pull away from the operator. Further, it is easy to change the sanding/abrasive pad of the present sanding apparatus. Moreover, the present sanding apparatus is capable of sanding surfaces adjacent to walls without damaging the walls.

A sanding apparatus in accordance with the present invention includes an elongated two piece frame having a handle end and a work end. The elongated frame may be made of tubing and used as a means of communicating vacuum and sanding waste. The handle end is arranged for operator control of the apparatus while the working end includes means for sanding or grinding. The handle end includes controls for controlling the sanding means at the work end of the apparatus. A stabilizer is located between the handle end and the work end of the sander. A stop member is also located between the handle end and the work end of the sander.

The work end of the sanding apparatus further includes a head having a housing that functions both as a suction housing and a gear housing. The head includes two pivots extending from a side surface of the housing. The head is rotatable about the pivots as described in more detail below.

A suction means is operatively connected to the housing. The head further includes a motor mounted on top of the housing. The head also includes a backing pad for mounting an abrasive thereon that is
5 operatively, drivingly connected to the motor through the gear housing.. A sanding/abrasive pad may be mounted onto the backing pad.

The head further includes at least one
10 side-wheel member extending from the side surface of the housing. The side-wheel member includes a roller rotatably mounted to an end of the side-wheel member. The roller is oriented such that it may travel along a wall adjacent to a sanding surface. The roller
15 thereby prevents the housing and/or the sanding pad from touching the wall while at the same time allowing the sanding pad to reach the edge of a sanding surface adjacent to a wall. The side-wheel member is adjustably mounted on the side surface of
20 the housing such that the side-wheel member may be moved and temporarily fixed at various positions along the side surface of the housing.

The handle end is rotatable about the
25 elongated frame. This allows the handle to be rotated 360 degrees about the elongated frame. This is useful, for example, when sanding along the edge of a wall because the handle may contact the wall when in a horizontal orientation but not while in a
30 vertical orientation. An operator therefore could rotate the handle towards a vertical orientation when approaching a wall and when sanding along the wall

and then move the handle back to a standard horizontal orientation afterwards.

The stabilizer includes a spindle acting as
5 an axis of rotation for at least one wheel, rubber roller, or other friction means. The wheel/roller is rotatable about the spindle. The stabilizer is preferably attached to the elongated frame closer to the work end than the handle end. The wheel/rubber
10 roller of the stabilizer grips and holds to a sanding surface to stabilize the sanding apparatus and to prevent it from walking/running away from the operator. The wheel/roller may rotate around the spindle, and may slide from side to side, to allow
15 the operator to move the sanding apparatus in any direction. The wheel/roller also allows the sanding apparatus to partially move off the edge of a sanding surface without the sanding apparatus leaning to a side. In a preferred embodiment, the wheel(s) may be
20 weighted and may include a high friction coating or layer thereon such as a rubberized coating or similar for contacting a sanding surface. Further, in a preferred embodiment, the stabilizer may include three wheels, two of which are outer wheels greater
25 in width than a third center wheel. The use of a plurality of wheels allows for differential rotation of the wheels, enabling easier turning of the sanding apparatus. Anti-friction washers, such as those constructed of a polycarbon material, Teflon, or
30 similar, may be located between the rollers to enhance the differential rotation of the wheels.

The stabilizer further includes a crossbar. The crossbar is mounted to the elongated frame. An arm extends from each end of the crossbar. The arms are mounted on one end to the crossbar and an attachment means is located on each arm at an end opposite of the end mounted to the crossbar. The attachment means allow for attachment of the arms to the pivots of the head. The arms may be separable to allow the head to be easily removed from the sanding apparatus.

The stop member is slidably mounted to the elongated frame and is rotatable about the elongated frame. The stop member includes a crossbar that preferably may be shorter in length than the diameter of the housing. The stop member further includes an arm extending from each end of the crossbar towards the housing of the head. The stop member arms are contactable with the top of the housing. The stop member prevents rotation of the head about the pivots as is more fully described below.

The ease in which an operator may change a sanding/abrasive pad used with the present invention is illustrated by the following. In order to change a pad, the operator first shuts off the motor, if running, to bring the sanding pad and the sanding apparatus to rest. The operator then slides the stop member towards the handle end, thereby releasing the ends of the stop member arms from contact with the housing. Once the stop member has been slid far enough towards the handle end such that the stop member arms are closer to the handle end than the

crossbar of the stabilizer, the stop member is rotated about the elongated frame. In this orientation, one of the stop member arms may rest against the stabilizer, preventing the stop member
5 from moving.

After moving the stop member, the operator pushes down on the handle end and/or the elongated frame, thereby raising the head above the sanding
10 surface. The head, being in a metastable position, rotates about the pivots approximately 180 degrees such that the bottom of the head moves from facing the sanding surface to facing upwards. The operator may use his or her hand to restrict the rotation of
15 the head so that the head may be slowly moved from its metastable position to a stable position. The operator may then raise the handle end and/or the elongated frame until the rotated head rests against the sanding surface.

20

At this time, the operator may remove the sanding/abrasive pad and replace it with another sanding/abrasive pad by mounting another sanding/abrasive pad on the backing pad of the
25 sanding apparatus. After changing the pad, the operator executes the preceding steps in reverse order. Specifically, the operator pushes the handle end and/or the elongated frame towards the ground, the operator rotates the head to its upright,
30 metastable position, and the operator raises the handle end and elongated frame until the sanding pad of the head contacts the sanding surface. The operator then rotates the stop member crossbar until

the stop member arms are free to move pass the stabilizer. The operator finally slides the stop member towards the work end and rests the ends of the stop member arms against the top of the housing.

5 When the arms of the stop member rest against the housing, the stop member prevents the head from rotating. For example, if the operator pushes the handle end down, thereby raising the work end, the head will be lifted off the sanding surface but will

10 not be able to rotate about the pivots.

The step of mounting a sanding/abrasive pad on the backing pad of the sanding apparatus may be performed in the following manner. The backing pad

15 has a plurality of evenly spaced suction holes close to the perimeter of the pad equidistant from the center of the pad. The backing pad further has another set of evenly spaced suction holes closer to the center of the pad that are also themselves all

20 equidistant from the pad center. The sanding/abrasive pads are also themselves made with the identical pattern of suction holes. The suction holes of the backing pad and the abrasive pad must be lined up so that all surface particles can be sucked

25 up by the suction means. The suction holes are spaced at such a distance from each other that as the abrasive pad sands a surface, thereby creating sanding waste, the particles are instantly sucked in through the holes into the suction chamber. This

30 keeps the sanding waste from clogging the abrasive pad and keeps the abrasive pad from sanding over the sanding waste.

The holes of the backing pad and an abrasive pad may be lined up with the use of an alignment tool that includes three locating pins. First, the three locating pins are received by three
5 holes in the abrasive pad. Then, with the locating pins placed through holes in the abrasive pad, the locating pins are pushed into three holes of the backing pad corresponding in location to the three
10 holes of the abrasive pad that received the locating pins. Optionally, an intermediate disc may be placed between the backing pad and the abrasive pad. The intermediate disc has slots for receiving the locating pins. The intermediate disc prevents the abrasive pad from inadvertently sticking to or
15 "bunching up" on the attachment means of the backing pad, for example hooks or loops of a hook and loop attachment means. The abrasive pad is then smoothly engaged with the backing pad. In the case that an intermediate disc is employed, the intermediate disc
20 may be slowly removed while the abrasive pad is simultaneously engaged with the backing pad. After the abrasive pad is smoothly engaged with the backing pad, the alignment tool is removed by pulling the locating pins out of the holes of the backing pad and
25 the abrasive pad. The holes of the backing pad and the abrasive pad are thereby perfectly aligned.

The invention also includes an abrasive pad in combination with the improved sanding apparatus.
30 These and other features and advantages of the invention will be more fully understood from the following detailed description of the invention taken together with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

5 FIG. 1 is a perspective view of a sanding apparatus in accordance with the present invention;

 FIG. 2 is a front perspective view of a work end of the apparatus of FIG. 1;

10 FIG. 3 is a plan view of a work end of the apparatus of FIG. 1;

 FIG. 4 is a plan view of a portion of a work end of the apparatus of FIG. 1;

15 FIG. 5 is a rear view of a work end of the apparatus of FIG. 1;

20 FIG. 6 is a plan view of the apparatus of FIG. 1 sanding a surface adjacent a wall;

 FIG. 7 is a side view of the handle end of the apparatus of FIG. 1 illustrating rotation of the handle end about an elongated frame of the apparatus;

25 FIG. 8 is a perspective view of the apparatus of FIG. 1 illustrating the sliding and rotation of a stop member of the apparatus along the elongated frame to release the stop member from contact with a housing of the apparatus;

FIG. 9 is a perspective view of the apparatus of FIG. 1 illustrating pushing the handle end of the apparatus down thereby raising the work end;

5

FIG. 10 is a perspective view of the apparatus of FIG. 1 in the orientation of FIG. 9 illustrating rotation of a head of the apparatus about pivots;

10

FIG. 11 is a perspective view of the apparatus of FIG. 1 illustrating returning the work end of the apparatus to the sanding surface;

15

FIG. 12 is a perspective view of the apparatus of FIG. 1 illustrating the sliding and rotation of the stop member of the apparatus along the elongated frame to return the stop member into contact with the housing of the apparatus;

20

FIG. 13 is a perspective view of the apparatus of FIG. 1 illustrating the stop member of the apparatus in contact with the housing of the apparatus;

25

FIG. 14 is a perspective view of an abrasive pad receiving locating pins of an alignment tool;

FIG. 15 is a perspective view of an abrasive pad being located and aligned on a backing pad with the aid of the alignment tool;

30

FIG. 16 is a perspective view of an abrasive pad aligned on a backing pad with the locating pins of the alignment tool received by corresponding holes in the backing pad and the abrasive pad; and

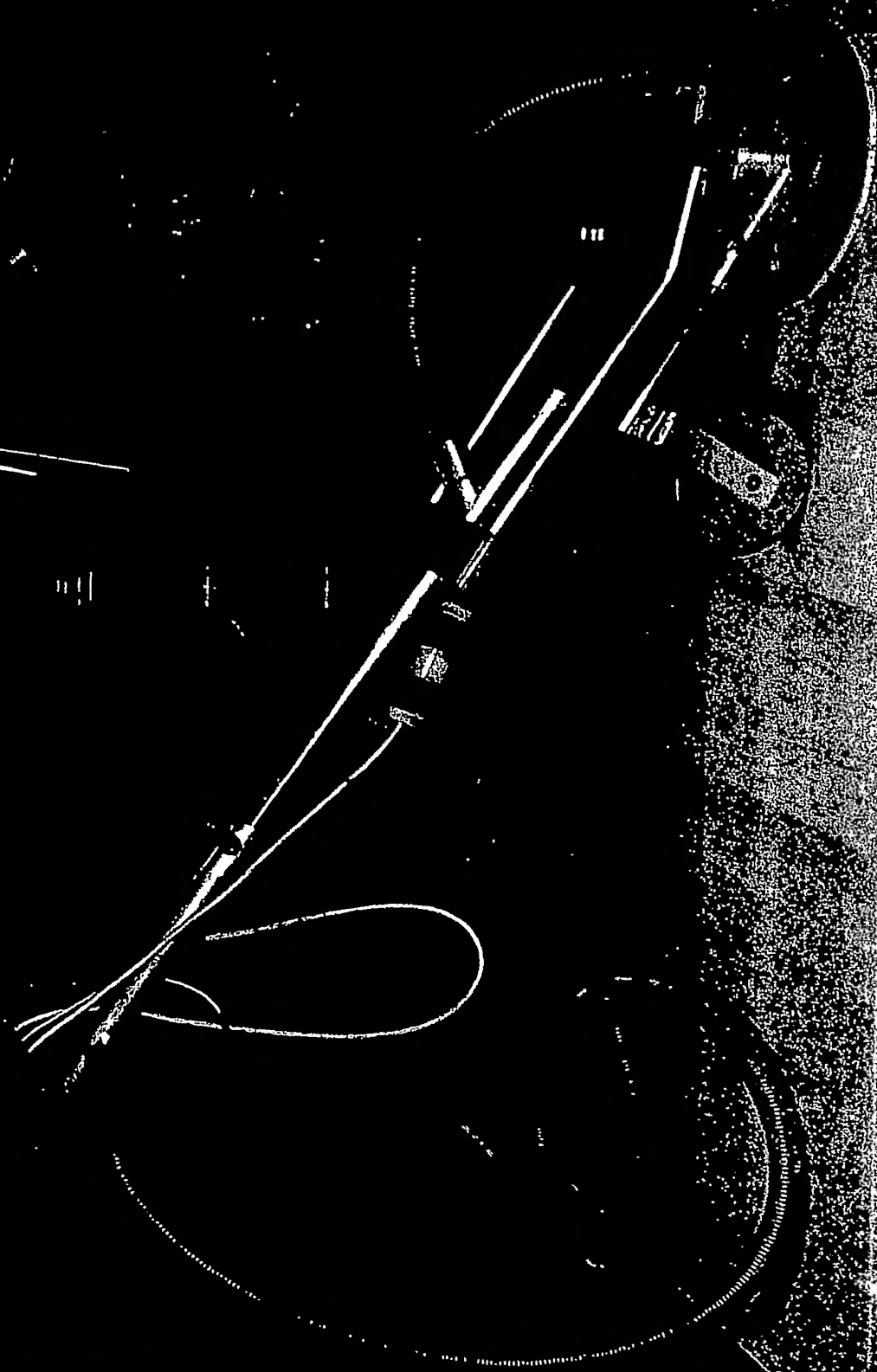
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FIG. 17 is a perspective view of an abrasive pad aligned and engaged with a backing pad.

10 Although the invention has been described by reference to a specific embodiment, it should be understood that numerous changes may be made within the spirit and scope of the inventive concepts described. Accordingly, it is intended that the invention not be limited to the described embodiment.

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Fig. 1



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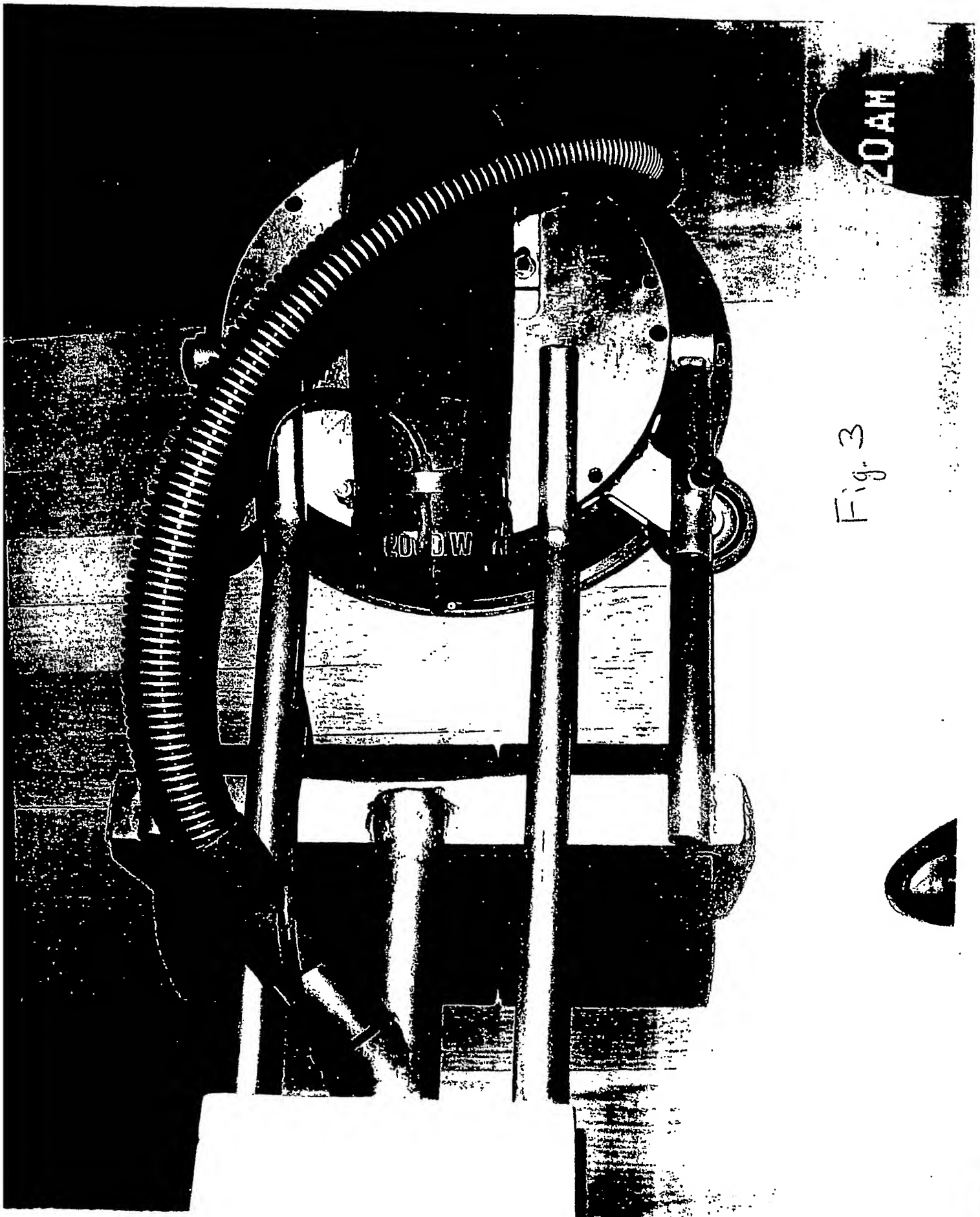
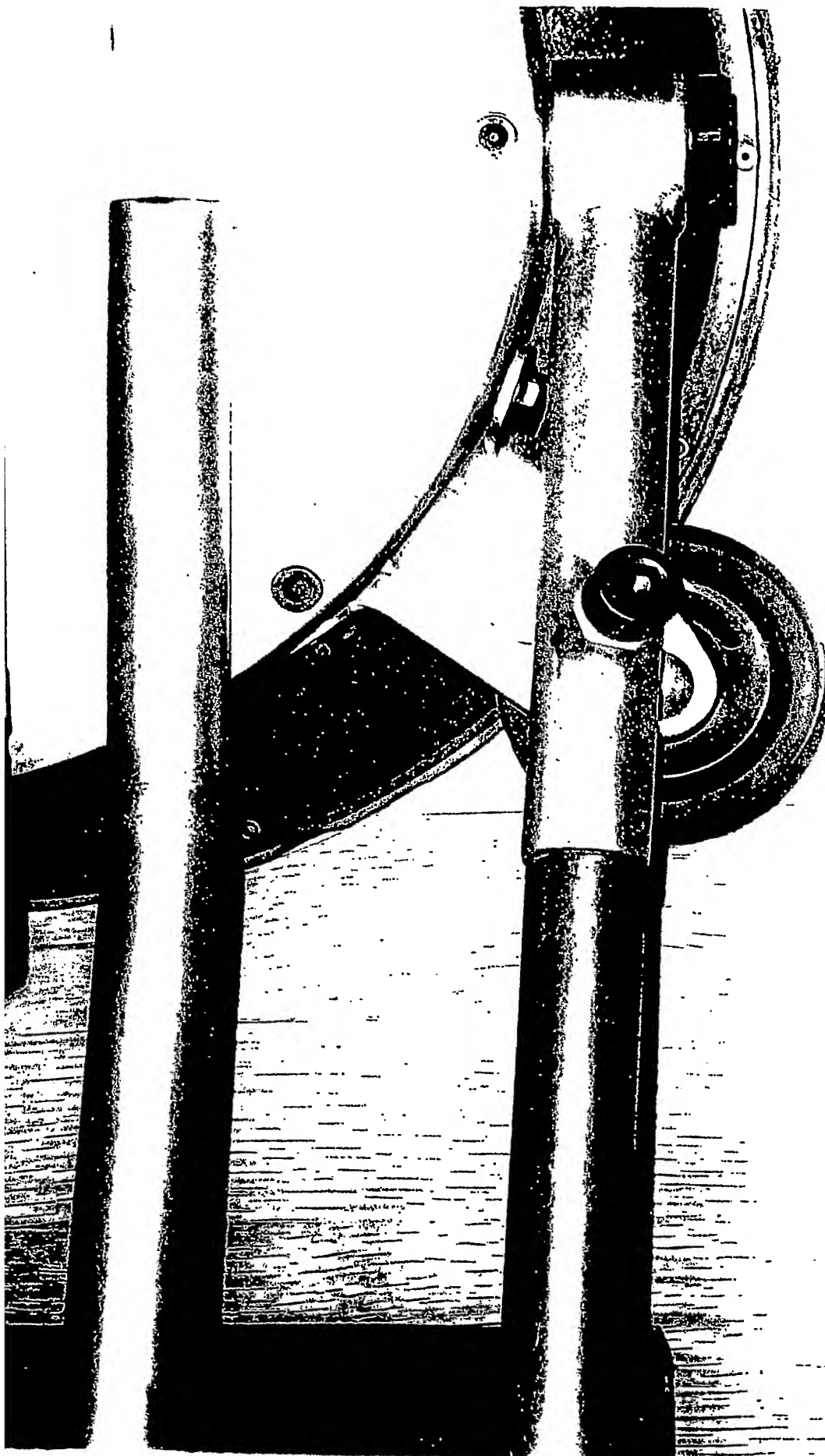


Fig. 3



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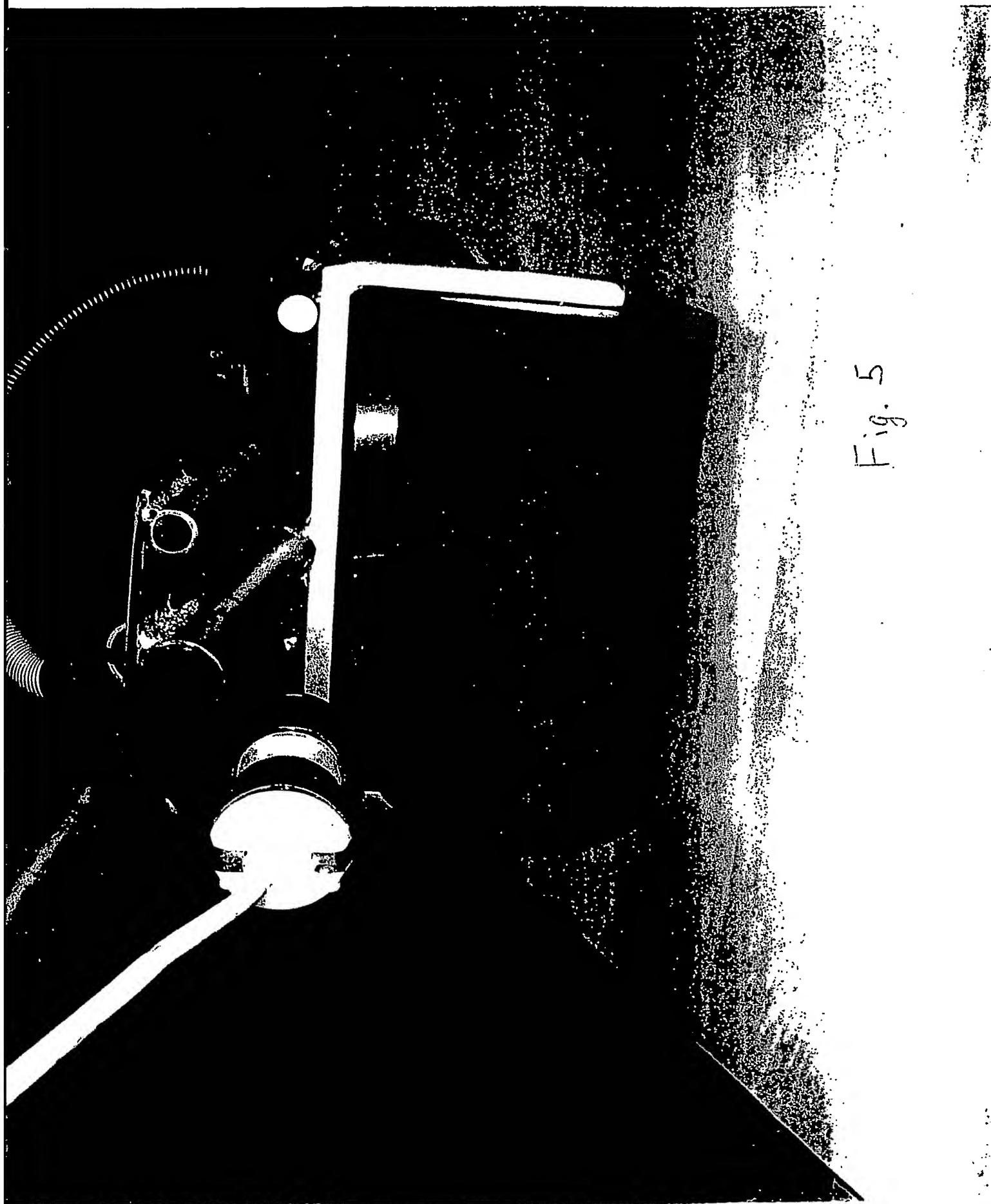
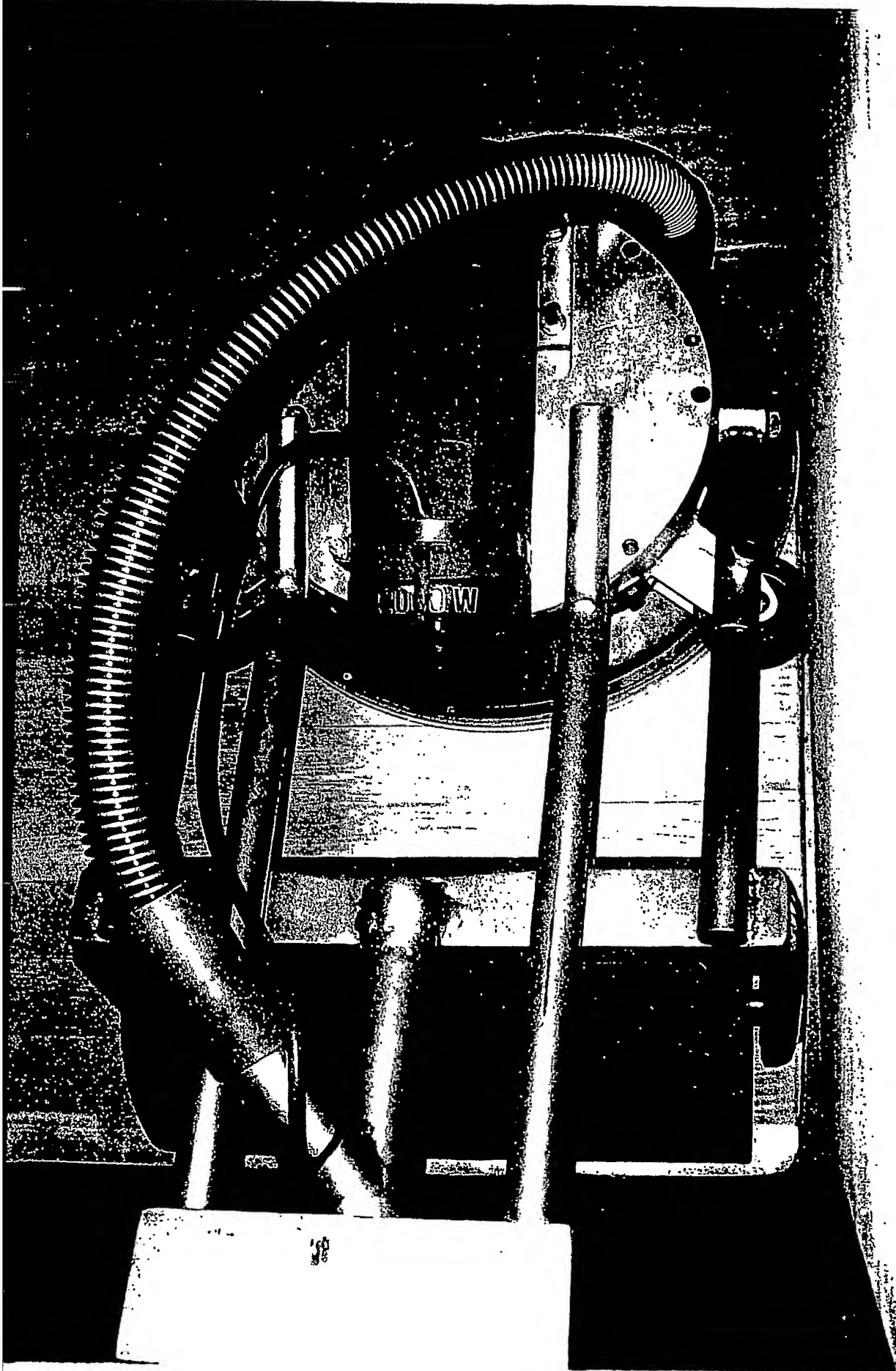
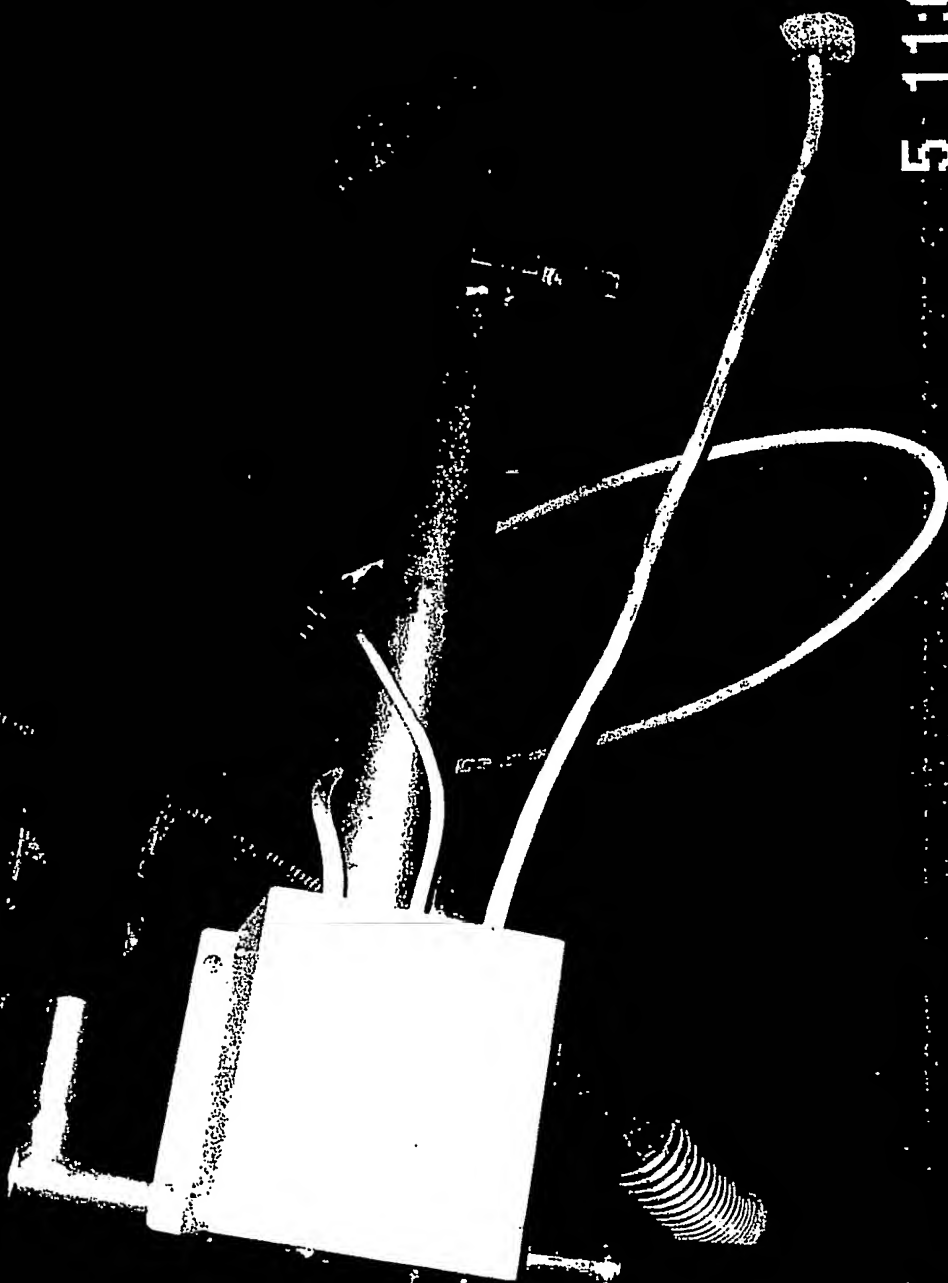
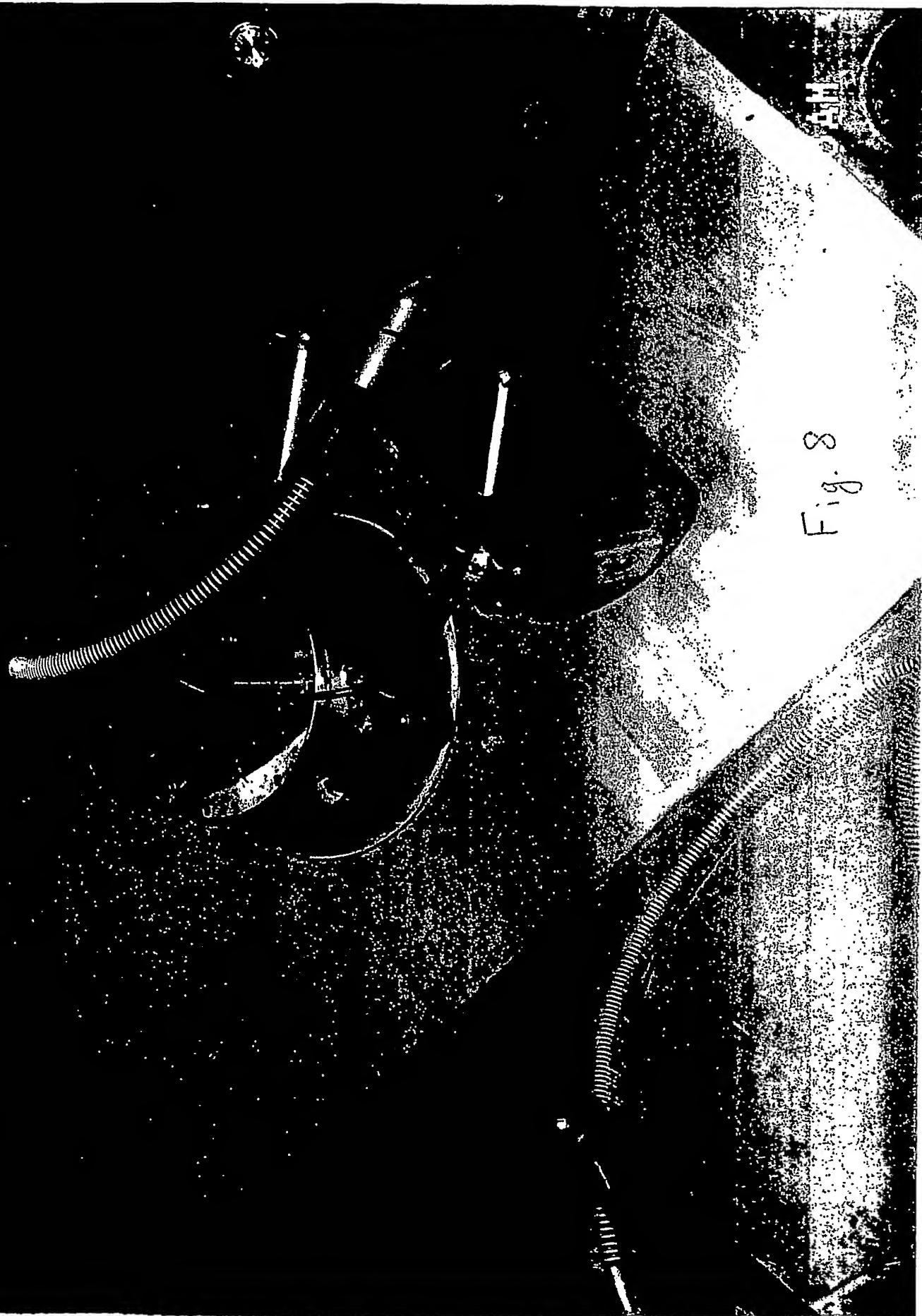


Fig. 5

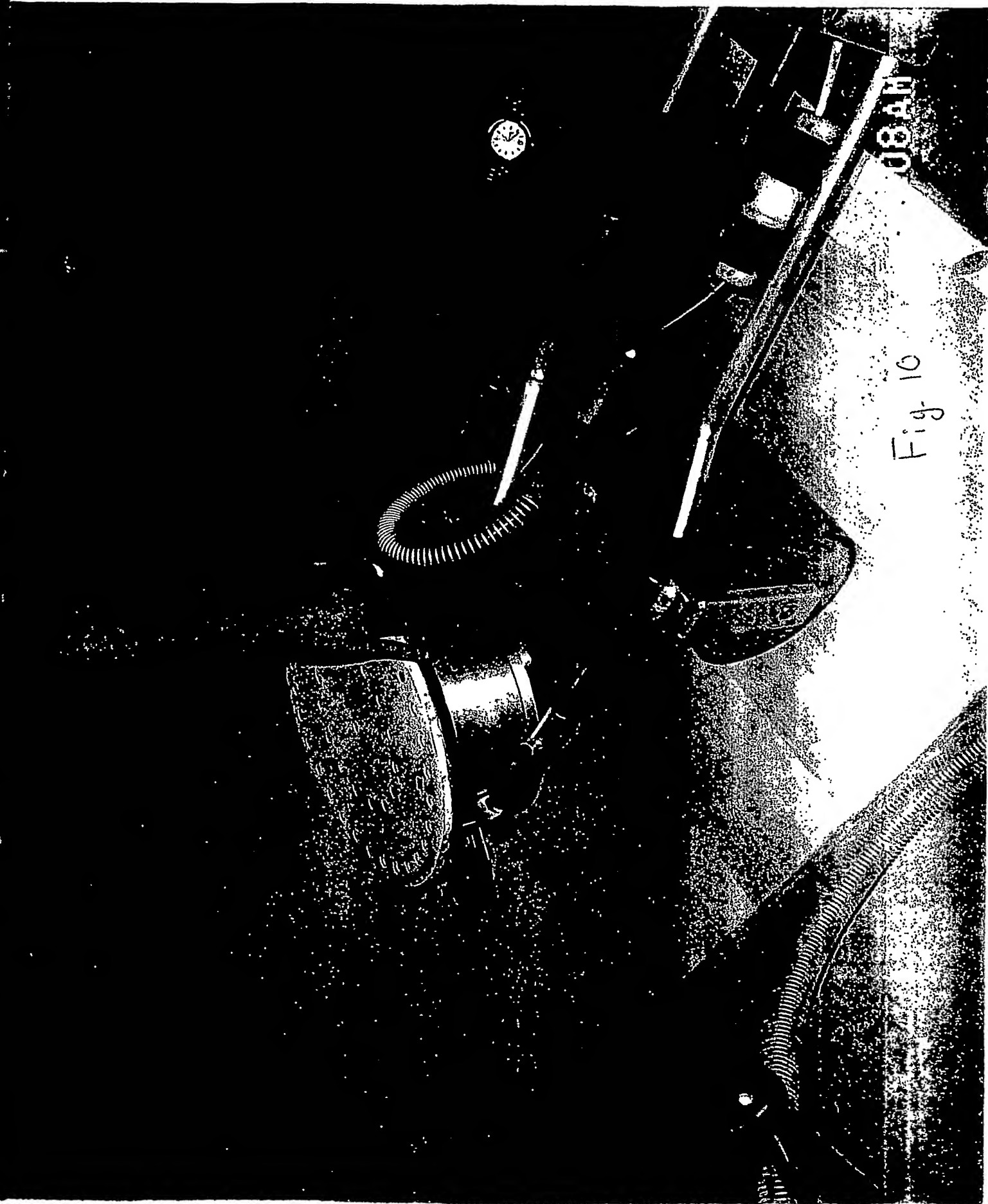


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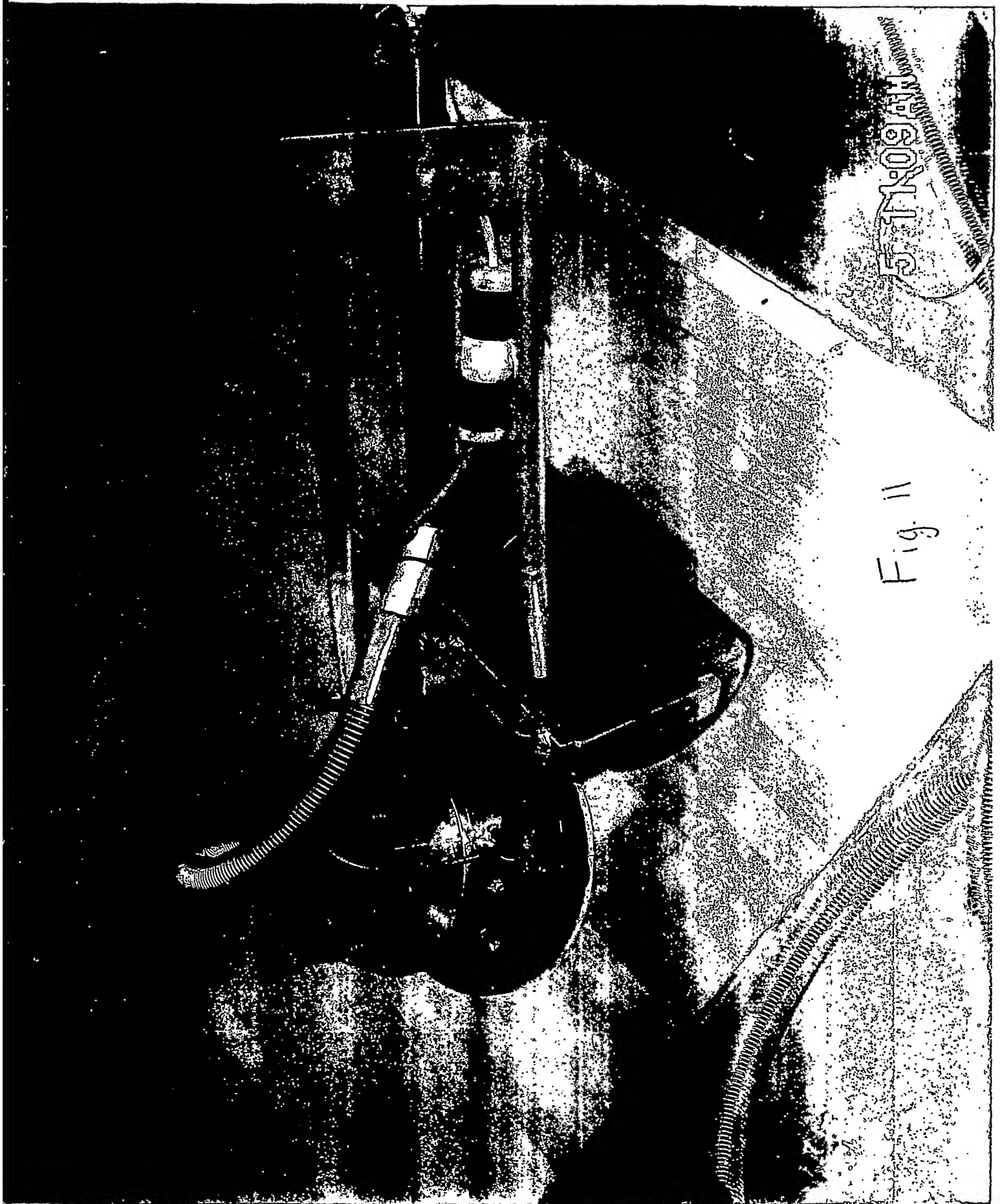
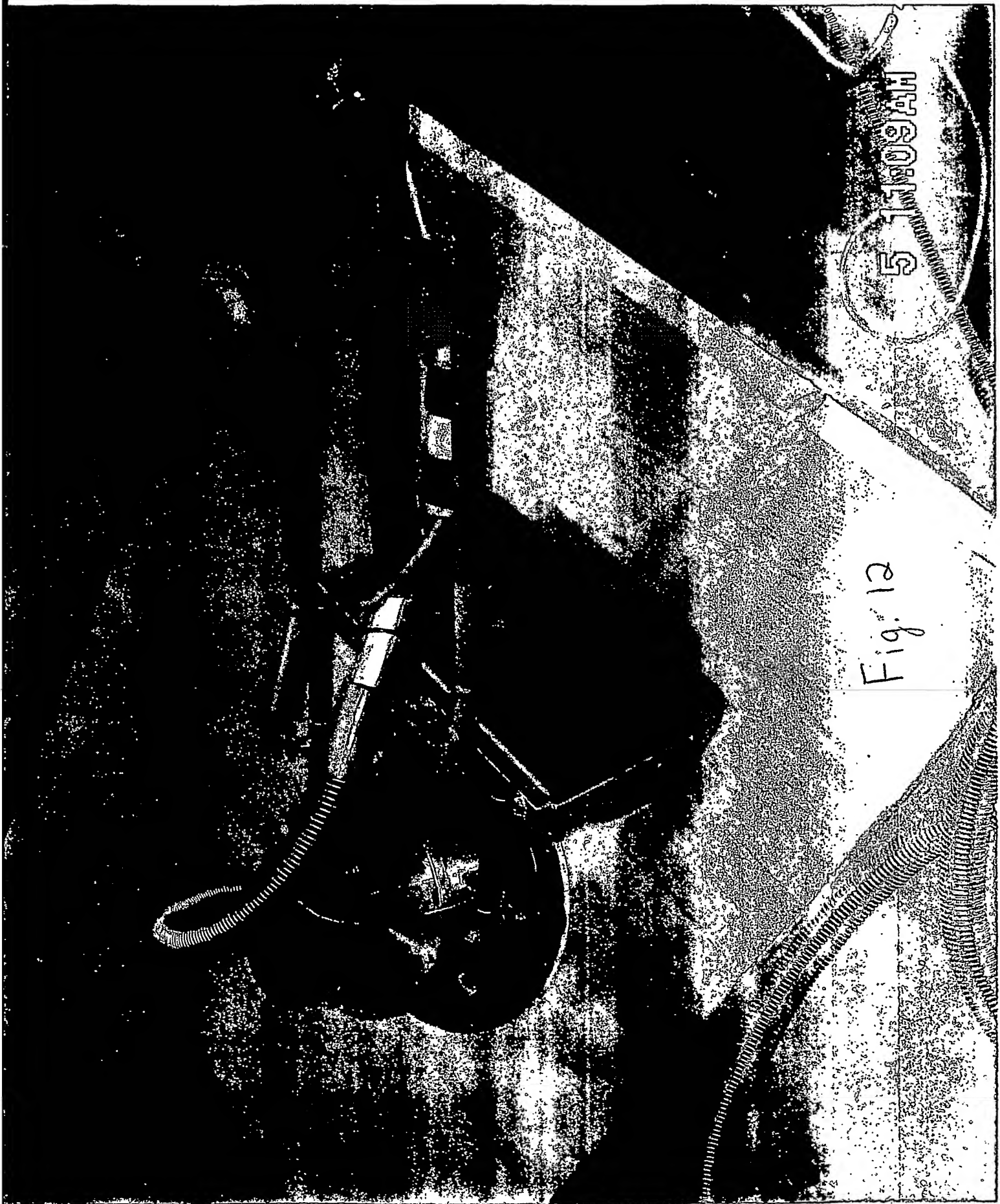


Fig. 11





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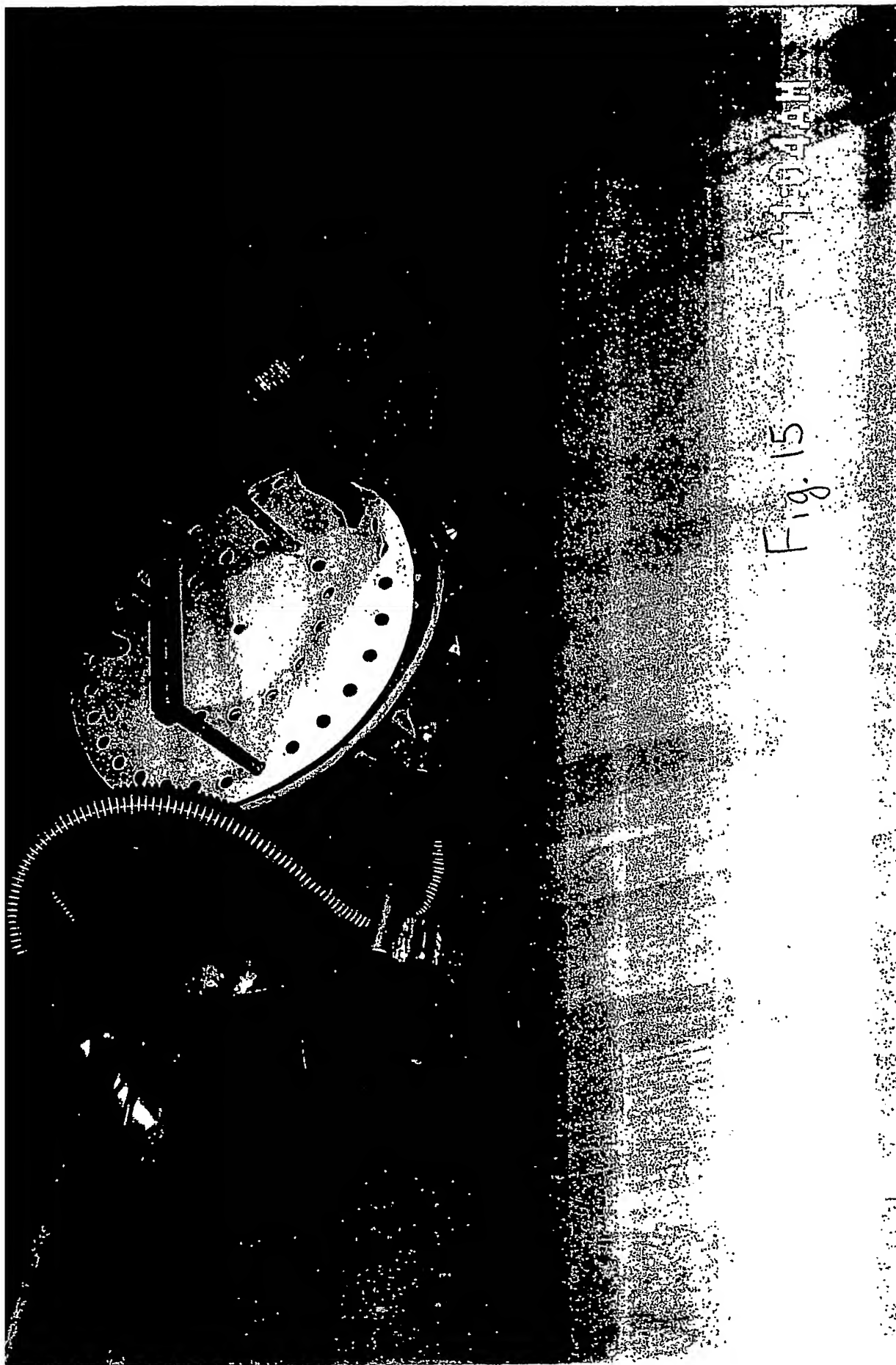
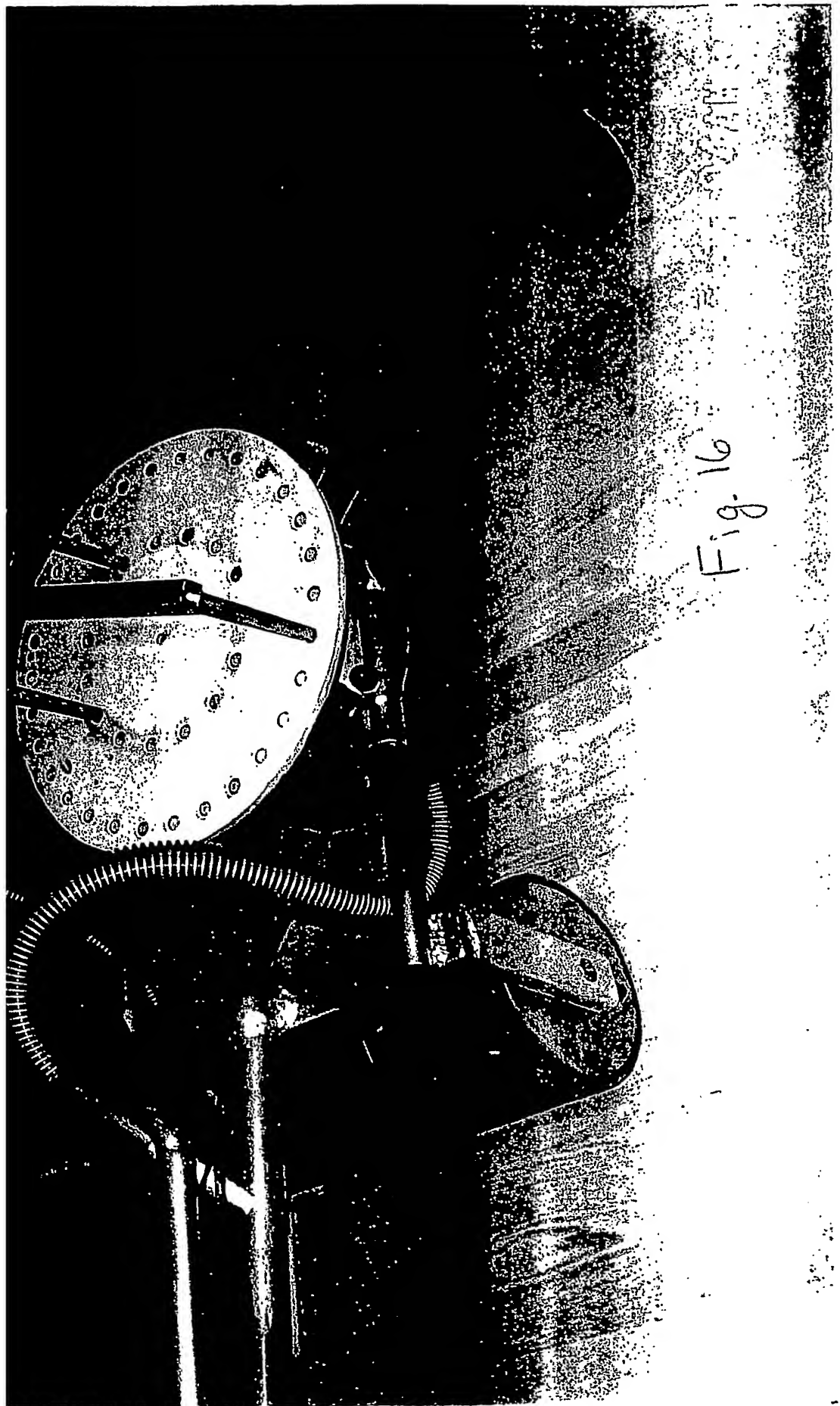
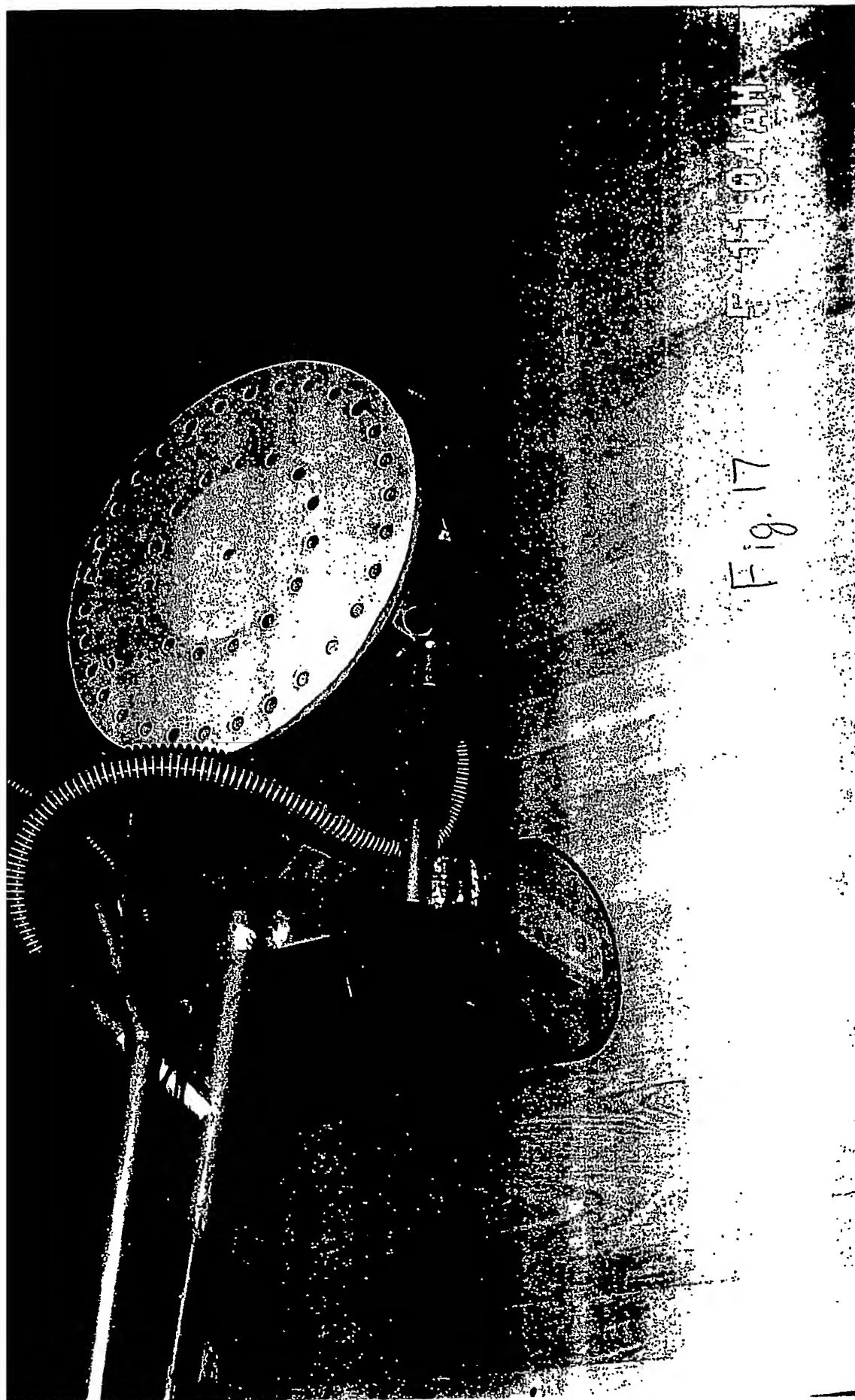


Fig. 15





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